The Effect of Etiolation on Rooting of *Acer grandidentatum* Cuttings©

Melody Reed and Larry A. Rupp
Plants, Soils, and Climate Department, Utah State University, Logan, Utah 84322-1400
Email: larry.rupp@usu.edu

INTRODUCTION

Bigtooth, or canyon, maple (*Acer grandidentatum* Nutt.) is of interest due to its fall color and potential use in low-water landscapes. Improved asexual propagation would facilitate the introduction and production of new clones from the wild. The objective of this study was to evaluate the effect of etiolation on rooting *A. grandidentatum* softwood cuttings.

MATERIALS AND METHODS

Five selections of bigtooth maple (USU-ACGR-1001, 1002, 1003, 1004, and 1005), grafted onto seedling rootstocks of the same species and grown in a coppiced nursery environment were used. In late January 2009, trees were prepared for etiolation by pruning just below the third node from the base and leaving a stub above the second node. At bud swell, black velour drawstring bags with open ends were placed over the terminals of randomly selected shoots and tied off just below the second node (Fig. 1). When approximately two sets of fully expanded leaves had emerged from the bag, cuttings were harvested by removing the parent shoot above the first node (Fig. 2). Cuttings were prepared for sticking by removing the bags, cutting at the base of the current season's growth, removing the terminal above the

Figure 1. Terminals of pruned shoots covered with velour bags to etiolate new growth.

Figure 2. Etiolated stem bases after removal of velour bags.

second node, wounding by scraping off one cm of bark down to the xylem on two sides, and then dipping in 4000 ppm IBA as Dip'N Grow® (1.0% IBA, 0.5% NAA as 20 mL Dip'N Grow in 30 mL 50% ethanol) for five sec. Cuttings were stuck in 3 ½ in. × 5 in. pots with premoistened media of perlite and peat (3 : 1, v/v) and then placed under shade cloth and mist (7 sec/12 min) with bottom heat at 25–26 °C.

RESULTS

Overall, 89% of etiolated cuttings rooted, whereas only 47% of the non-etiolated cuttings rooted (Figs. 3 & 4). Trees 1001, 1002, 1004, and 1005 all had rooting percentages of over 83% with etiolation. The greatest difference in etiolated and non-etiolated rooting was found with tree 1001 where etiolation increased rooting percent by 64 points. The least difference was with tree 1004 where etiolation increased rooting by 29 points. Data collected on the number of roots per cutting indicated that, overall, etiolated cuttings had an average of 11.3 roots per cutting, while non-etiolated averaged 2.1 roots per cutting. Cuttings from all trees had significantly more roots per cutting when etiolated (Fig. 4).

DISCUSSION

The results of this study indicate that etiolation of bigtooth shoots from mature, coppiced clones grown on seedling rootstocks significantly improves rooting of softwood cuttings. The level of rooting appears to be high enough to warrant exploration of the use of softwood cuttings for commercial production of selected clones, should further research indicate that own-rooted bigtooth maples perform effectively under both nursery and landscape environments. The effect of etiolation on rooting suggests that layering may be an effective means of vegetative propagation. The use of bags to provide etiolation has also proven to be effective as an alternative to other methods of etiolation.

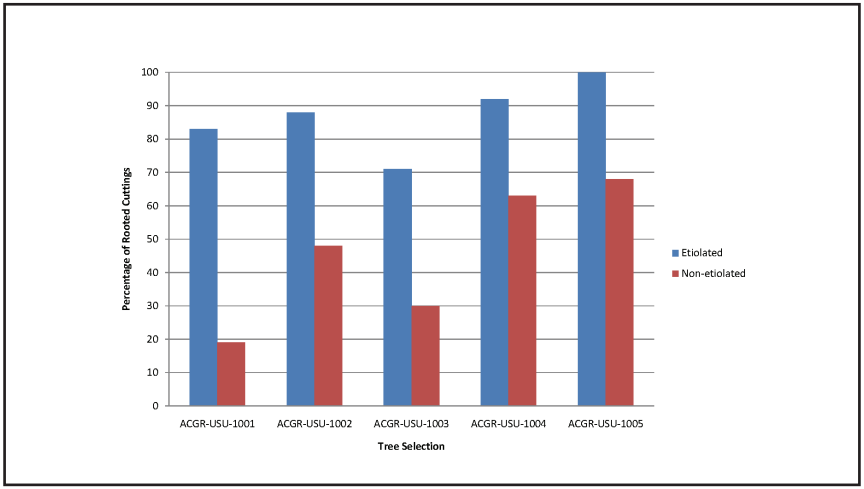

Figure 3. The effect of etiolation on the percentage of rooted cuttings in bigtooth maple. Etiolation significantly increased the percentage of rooted cuttings in all clones as shown by Two-sample T-test.

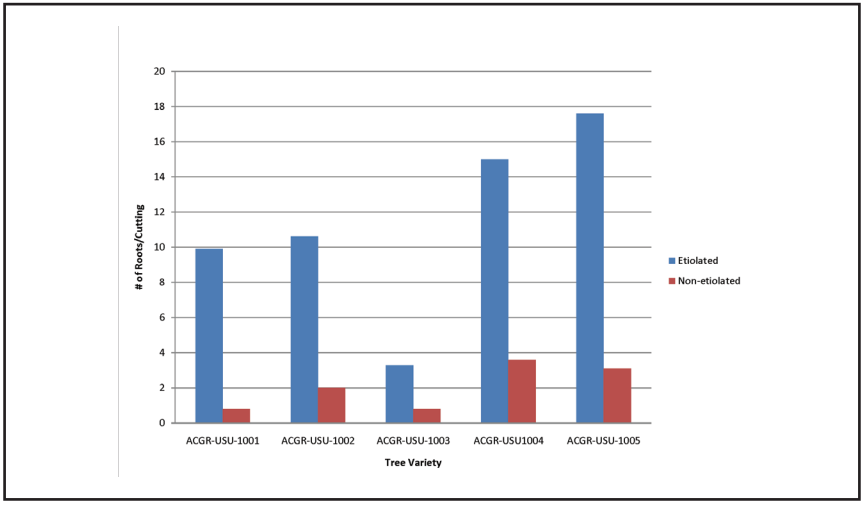

Figure 4. The effect of etiolation on the average number of roots per cutting in bigtooth maple. The etiolated cuttings had significantly more roots with all clones at p values of <0.001 (P<0.000).

It is interesting to note that up to 68% of non-etiolated cuttings rooted, depending on the clone. Further research is needed to help explain this relatively high rate of rooting even in the absence of etiolation. Future research will include determining the efficacy and economic efficiency of layering bigtooth maple clones as a commercial propagation method. In addition, a comparison of performance in Utah landscapes by clones propagated on sugar maple and bigtooth maple rootstocks, as well as own-rooted is greatly needed.